

Case Report

Effectiveness of Diet, Exercise, and Auricular Vagus Nerve Stimulation in Reducing Body Weight Among Obese Individuals

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Abstract

This research examined and compared the effectiveness of three different weight-loss approaches—diet, exercise, and auricular vagus nerve stimulation (VNS)—in obese adults over a short period, with the goal of identifying which intervention produces the greatest improvement in body weight, body composition, and related metabolic and lifestyle outcomes. It also aimed to assess how each method influences factors such as appetite regulation, physical fitness, and overall health status during the intervention period.

Keyword: Obesity, Weight loss, Diet intervention, Physical exercise

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Introduction

This research examined and compared the effectiveness of three different weight-loss approaches—diet, exercise, and auricular vagus nerve stimulation (VNS)—in obese adults over a short period.

Aim of the Study

The study aimed to evaluate how diet control, structured physical exercise, and non-invasive auricular VNS influence:

- Body weight and BMI
- Body composition
- Functional capacity
- Appetite and food preferences
- Quality of life
- Study Design

A total of 90 obese participants (aged 18–65 years, BMI ≥ 25 kg/m²) were randomly divided into three equal groups:

Diet group

- Exercise group
- Vagus nerve stimulation group

Each intervention lasted 4 weeks. Participants were monitored at the beginning, after 2 weeks, and after 4 weeks.

Interventions

- Diet group: Followed a Mediterranean-style, protein-focused calorie-controlled diet.
- Exercise group: Performed regular aerobic walking and resistance exercises several times per week.
- VNS group: Received auricular vagus nerve stimulation using a device applied to the ear in multiple sessions per week.
- Main Findings
- All three groups showed significant weight loss over the 4-week period.
- The diet group experienced the greatest weight reduction, followed by the exercise group, while the VNS group showed the smallest loss.
- Improvements in body composition (fat reduction and circumference measurements) were observed across all groups.
- Exercise helped better preserve muscle mass compared to diet and VNS.
- VNS did not produce strong weight loss but appeared to influence appetite regulation and food choices.
- Key Results (Simplified)
- Diet group: ~10% body weight reduction
- Exercise group: ~6% reduction
- VNS group: ~4% reduction

Conclusion

The study concluded that:

- Diet and exercise remain the most effective methods for short-term weight loss.
- Auricular vagus nerve stimulation may not significantly reduce weight alone, but it could support behavioral changes related to appetite control.
- VNS might be useful as an additional or complementary treatment for obesity rather than a standalone solution.
- Longer-term studies are needed to better understand its effects.

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